wherein the compound represented by formula (I),

$$H$$
 S CH_2 CH_2 NH R

or alternatively, the compound represented by formula (II),

is reacted with chlorine (Cl₂) as a chlorinating agent in a solvent in which hydrogen chloride is insoluble or has low solubility,

wherein the molar-equivalent ratio of said chlorinating agent to the compound of formula (I) is 2:1, or alternatively,

wherein the molar-equivalent ratio of said chlorinating agent to said the compound of formula (II) is 3:1,

wherein R in the compounds of formulas (I), (II), and (III) represents C1 to C8 alkyl groups or aralkyl groups, and

wherein the 2-alkyl-4-isothiazoline-3-one of Formula III produced is essentially free of 5-chloro-2-alkyl-4-isothiazoline-3-one.

Please add the following new claims:

20. A method of producing 2-alkyl-4-isothiazoline-3-one represented by the general

formula (III),

wherein the compound represented by formula (I),

Block

or alternatively, the compound represented by formula (II).

is reacted with chlorine (Cl₂) as a chlorinating agent in a solvent in which hydrogen chloride is insoluble or has low solubility,

wherein the molar-equivalent ratio of said chlorinating agent to the compound of formula (I) is 2:1, or alternatively,

wherein the molar-equivalent ratio of said chlorinating agent to said the compound of formula (II) is 3:1,

wherein R in the compounds of formulas (I), (II), and (III) represents C1 to C8 alkyl groups or aralkyl groups, and

wherein the 2-alkyl-4-isothiazoline-3-one of Formula III produced contains less than 1.0% of 5-chloro-2-alkyl-4-isothiazoline-3-one.

- 21. The method of producing 2-alkyl-4-isothiazoline-3-one stated in Claim 20 in which the 2-alkyl-4-isothiazoline-3-one of Formula III produced contains less than 0.5% of 5-chloro-2-alkyl-4-isothiazoline-3-one.
- 22. The method of producing 2-alkyl-4-isothiazoline-3-one stated in Claim 20 in which the chlorine (Cl₂) chlorinating agent is a gas.
- 23. The method of producing 2-alkyl-4-isothiazoline-3-one stated in Claim 1 in which the chlorine (Cl₂) chlorinating agent is a gas.